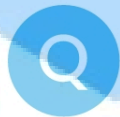




## QUIZZES

Practice test 1 Unit 5



10 Questions



7 min

### Topics

First law of thermodynamics, Isothermal process, Adiabatic process, Isobaric process and Isochoric process

Start Quiz

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06 : 58



1/10



7 min



Hint

Q : The rapid expansion and compression of air through which a sound wave is passing, obeys



Isothermal process



Isochoric process



Adiabatic process



Isobaric process

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06 : 56



2/10



7 min



Hint

Q : In isothermal process which of the following is not true



temperature remains constant



Internal energy does not change



no heat enters or leaves the system



none

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06 : 54



Q 3/10

7 min

Hint

Q : First law of thermodynamics for an adiabatic process is

A  $W = -\Delta U$

B  $Q = \Delta U + W$

C  $Q = W$

D  $Q = \Delta U$

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06 : 53



4/10



7 min



Hint

Q : Four curves A, B, C and D are drawn in the adjoining figure for a given amount of gas. The curves which represent adiabatic and isothermal changes are

A

C and D respectively

B

D and C respectively

C

A and B respectively

D

B and A respectively

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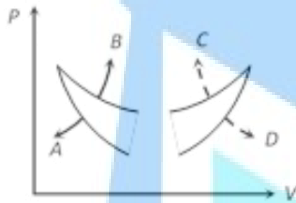


Q 4/10

7 min

Hint

Q : Four curves A, B, C and D are drawn in the adjoining figure for a given amount of gas. The curves which represent adiabatic and isothermal changes are



A C and D respectively

B D and C respectively

C A and B respectively

D B and A respectively

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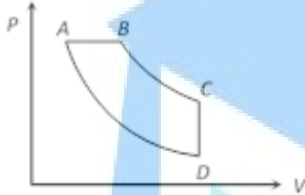


Q 5/10

7 min

Hint

Q : In pressure-volume diagram given below, the isochoric, isothermal, and isobaric parts respectively, are



A BA, AD, DC

B DC, CB, BA

C AB, BC, CD

D CD, DA, AB

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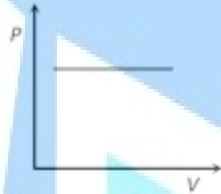
Q 6/10

7 min

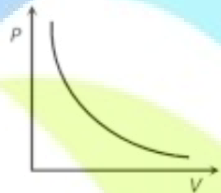
Hint

Q : Which of the accompanying PV, diagrams best represents an isothermal process

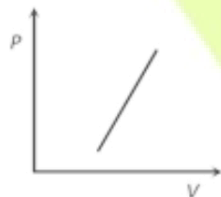
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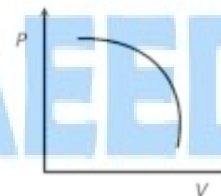
B



C



D



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06 : 40



7/10



7 min



Hint

Q : Heat given to a system is 35 joules and work done by the system is 15 joules. The change in the internal energy of the system will be

A

- 50 J

B

20 J

C

30 J

D

50 J

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06 : 37



8/10



7 min



Hint

Q : When the amount of work done is 333 cal and change in internal energy is 167 cal, then the heat supplied is



166 cal



333 cal



500 cal



400 cal

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06 : 36



9/10



7 min



Hint

Q : A perfect gas contained in a cylinder is kept in vacuum. If the cylinder suddenly bursts, then the temperature of the gas



Remains constant



Becomes zero



Increases



Decreases

# SAEED MDCAT

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06 : 33



10/10



7 min



Hint

Q : If heat given to a system is 6 kcal and work done is 6 kJ. Then change in internal energy is



19.1 kJ



12.5 kJ



25 kJ



Zero

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## QUIZ RESULT

Practice test 1 Unit 5



10



7 min



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Result Detail

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Physics

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## Practice test 1 Unit 5



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1/10

Q : The rapid expansion and compression of air through which a sound wave is passing, obeys

A

Isothermal process

B

Isochoric process

C

Adiabatic process

D

Isobaric process

### Explanation

According to LAPLACE it is proved that sound travel adiabatically.

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## Practice test 1 Unit 5



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Incorrect



2/10

Q : In isothermal process which of the following is not true

A

temperature remains constant

B

Internal energy does not change

C

no heat enters or leaves the system

D

none

### Explanation

During isothermal process heat enter or leave system to do work.

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## Practice test 1 Unit 5



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3/10

Q : First law of thermodynamics for an adiabatic process is

A

$$W = -\Delta U$$

B

$$Q = \Delta U + W$$

C

$$Q = W$$

D

$$Q = \Delta U$$

Explanation

$$Q = \Delta U + W$$

For adiabatic process

$$Q = 0$$

$$W = -\Delta U$$

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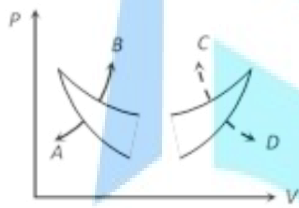


Incorrect



4/10

Q : Four curves A, B, C and D are drawn in the adjoining figure for a given amount of gas. The curves which represent adiabatic and isothermal changes are



A

C and D respectively

B

D and C respectively

C

A and B respectively

D

B and A respectively

Explanation

As we know that slope of isothermal and adiabatic curves are always negative and slope of adiabatic curve is always greater than that of isothermal curve. Hence in the given graph curve A and B represents adiabatic and isothermal changes respectively.



## Practice test 1 Unit 5



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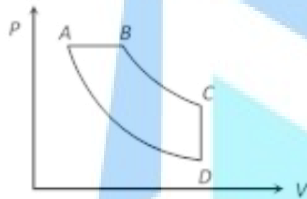


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5/10

Q : In pressure-volume diagram given below, the isochoric, isothermal, and isobaric parts respectively, are



A

BA, AD, DC

B

DC, CB, BA

C

AB, BC, CD

D

CD, DA, AB

### Explanation

Process CD is isochoric as volume is constant, Process DA is isothermal as temperature constant and Process AB is isobaric as pressure is constant.



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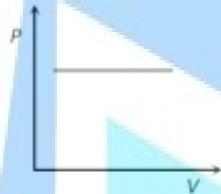
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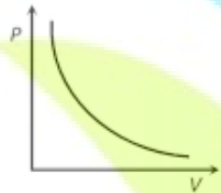
6/10

Q : Which of the accompanying PV, diagrams best represents an isothermal process

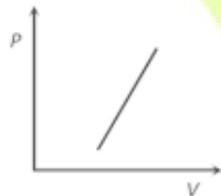
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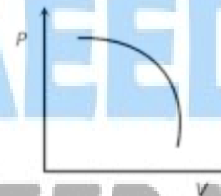
B



C



D



Explanation



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In isothermal process

$$P \propto 1/V.$$

Hence graph between P and V is a hyperbola.

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## Practice test 1 Unit 5



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7/10

Q : Heat given to a system is 35 joules and work done by the system is 15 joules. The change in the internal energy of the system will be

A

- 50 J

B

20 J

C

30 J

D

50 J

Explanation

$$\Delta U = \Delta Q - W = 35 - 15 = 20 \text{ J}$$

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## Practice test 1 Unit 5



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8/10

Q : When the amount of work done is 333 cal and change in internal energy is 167 cal, then the heat supplied is

A

166 cal

B

333 cal

C

500 cal

D

400 cal

Explanation

$$\Delta Q = \Delta U + \Delta W = 167 + 333 = 500 \text{ cal}$$

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## Practice test 1 Unit 5



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9/10

Q : A perfect gas contained in a cylinder is kept in vacuum. If the cylinder suddenly bursts, then the temperature of the gas

A

Remains constant

B

Becomes zero

C

Increases

D

Decreases

### Explanation

During free expansion of a perfect gas no, work is done and also no heat is supplied from outside. Therefore, no change in internal energy. Hence, temperature remain constant.

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## Practice test 1 Unit 5



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Q : If heat given to a system is 6 kcal and work done is 6 kJ. Then change in internal energy is

A

19.1 kJ

B

12.5 kJ

C

25 kJ

D

Zero

Explanation

$$\Delta Q = \Delta U + \Delta W$$

p

$$\Delta U = \Delta Q - \Delta W$$

$$= 6 \times 4.18 - 6 = 19.08 \text{ kJ}$$

$$\approx 19.1 \text{ kJ}$$



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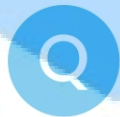
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## QUIZZES

Practice test 2 Unit 5



10 Questions



7 min

### Topics

Isothermal process, Adiabatic process, Isobaric process  
and Isochoric process, Specific heat and Molar specific  
heat / specific heat capacity

Start Quiz

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06 : 58



1/10



7 min



Hint

Q : The amount of heat required to raise the temperature of one kg of substance through 1K is called:



Specific Heat



Molar Heat Capacity



Heat of fusion



Latent heat of fusion

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06 : 56



Q 2/10

7 min

Hint

Q : For 1 mole of gas the relation  $P\Delta V =$

A  $R\Delta T$

B  $R\Delta V$

C  $R\Delta P$

D  $P\Delta T$

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06 : 54



3/10



7 min



Hint

Q : A gas, for which  $\gamma$  is  $4/3$ , is heated at constant pressure. The percentage of heat supplied used for external work is



25%



75%



60%



40%

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06 : 52



4/10



7 min



Hint

Q : The difference between the molar specific heat at constant pressure and volume is called



molar gas constant



universal gas constant



pressure constant



Boltzman constant

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06 : 50



Q 5/10

7 min

Hint

Q : For mono-atomic gas  $C_V = \frac{3R}{2}$ , therefore  $\gamma$  for this gas is

A  $\frac{3}{2}$

B  $\frac{3}{5}$

C  $\frac{5}{3}$

D  $\frac{3}{4}$

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06 : 48



6/10



7 min



Hint

Q : The unit of molar specific heat is same as that of



Molar ideal gas constant



Temperature



Pressure



Heat

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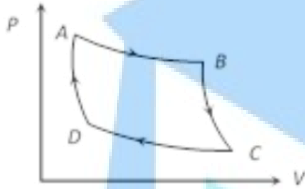


Q 7/10

7 min

i Hint

Q : The P-V graph of an ideal gas cycle is shown here as below. The adiabatic process is described by



A AB and BC

B AB and CD

C BC and DA

D BC and CD

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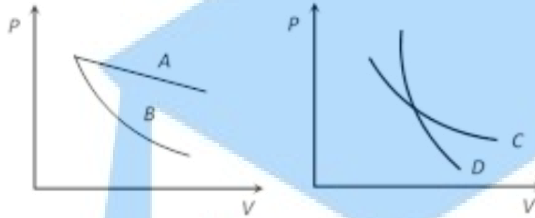


Q 8/10

7 min

Hint

Q : n the following figure, four curves A, B, C and D are shown. The curves are



- A Isothermal for A and D while adiabatic for B and C
- B Adiabatic for A and C while isothermal for B and D
- C Isothermal for A and B while adiabatic for C and D
- D Isothermal for A and C while adiabatic for B and D

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06 : 34



9/10



7 min



Hint

Q :

The specific heats at constant pressure is greater than that of the same gas at constant volume because

A

at constant pressure work is done in expanding the gas

B

at constant volume work is done in expanding the gas

C

the molecular attraction increases more at constant pressure

D

the molecular vibration increases more at constant pressure

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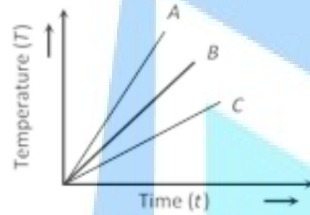
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Hint

Q :

Which of the substances A, B or C has the highest specific heat ? The temperature vs time graph is shown



A

A

B

B

C

C

D

All have equal specific heat

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## QUIZ RESULT

Practice test 2 Unit 5



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7 min



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Result Detail

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| Incorrect   | 0  |
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Physics

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## Practice test 2 Unit 5



Correct



Unattempted



Incorrect



1/10

Q : The amount of heat required to raise the temperature of one kg of substance through 1K is called:

A

Specific Heat

B

Molar Heat Capacity

C

Heat of fusion

D

Latent heat of fusion

### Explanation

Specific heat is defined as amount of heat required to raise temperature of 1 kg mass by 1K.

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## Practice test 2 Unit 5



Correct



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2/10

Q : For 1 mole of gas the relation  $P\Delta V =$

A

$R\Delta T$

B

$R\Delta V$

C

$R\Delta P$

D

$P\Delta T$

Explanation

As  $W = P\Delta V$  \_\_\_\_\_ (i) also  $P\Delta V = nR\Delta T \therefore n = 1$

$P\Delta V = R\Delta T$  \_\_\_\_\_ (ii)

So, by comparing (i) and (ii)

$W = R\Delta T = P\Delta V$

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## Practice test 2 Unit 5



Correct



Unattempted



Incorrect



3/10

Q : A gas, for which  $\gamma$  is  $4/3$ , is heated at constant pressure. The percentage of heat supplied used for external work is

A

25%

B

75%

C

60%

D

40%

Explanation

$$\Delta W = nR\Delta T, \Delta Q = nC_p\Delta T$$

$$\frac{\Delta W}{\Delta Q} = \frac{R}{C_p} = \frac{C_p - C_v}{C_p}$$

$$= 1 - \frac{C_v}{C_p} = 1 - \frac{3}{4} = 25\%$$



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Correct



Unattempted



Incorrect



4/10

Q : The difference between the molar specific heat at constant pressure and volume is called

A

molar gas constant

B

universal gas constant

C

pressure constant

D

Boltzman constant

Explanation

$$C_p - C_v = R$$

'R' is universal gas constant.

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## Practice test 2 Unit 5



Correct



Unattempted



Incorrect



5/10

Q : For mono-atomic gas  $C_v = \frac{3R}{2}$ , therefore  $\gamma$  for this gas is

A

$$\frac{3}{2}$$

B

$$\frac{3}{5}$$

C

$$\frac{5}{3}$$

D

$$\frac{3}{4}$$

Explanation

$$C_p - C_v = R$$

$$C_p = R + C_v$$

$$= R + \frac{3R}{2}$$

$$C_p = \frac{5R}{2}$$

$$\gamma = \frac{C_p}{C_v} = \frac{\frac{5R}{2}}{\frac{3R}{2}} = \frac{5}{3}$$

$$\gamma = \frac{5}{3}$$

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## Practice test 2 Unit 5



Correct



Unattempted



Incorrect



6/10

Q : The unit of molar specific heat is same as that of

A

Molar ideal gas constant

B

Temperature

C

Pressure

D

Heat

Explanation

$C_p - C_v = R$   
added

Only quantities having same dimensions be

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## Practice test 2 Unit 5



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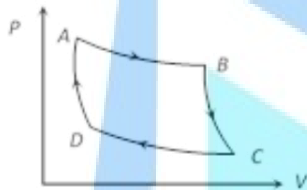


Incorrect



7/10

Q : The P-V graph of an ideal gas cycle is shown here as below. The adiabatic process is described by



A

AB and BC

B

AB and CD

C

BC and DA

D

BC and CD

Explanation

AD and BC represent adiabatic process (more slope) AB and DC represent isothermal process (less slope)



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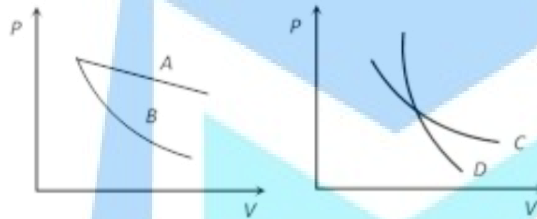


Incorrect



8/10

Q : n the following figure, four curves A, B, C and D are shown. The curves are



A

Isothermal for A and D while adiabatic for B and C

B

Adiabatic for A and C while isothermal for B and D

C

Isothermal for A and B while adiabatic for C and D

D

Isothermal for A and C while adiabatic for B and D

Explanation

- Adiabatic curves are more steeper than isothermal curves.



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Incorrect



9/10

Q :

The specific heats at constant pressure is greater than that of the same gas at constant volume because

A

at constant pressure work is done in expanding the gas

B

at constant volume work is done in expanding the gas

C

the molecular attraction increases more at constant pressure

D

the molecular vibration increases more at constant pressure

Explanation

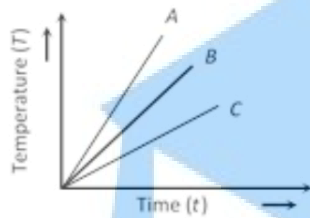
- Work done is to be done in expanding the gas at constant pressure.





Q :

Which of the substances A, B or C has the highest specific heat ? The temperature vs time graph is shown



A

A

B

B

C

C

D

All have equal specific heat

## Explanation

Substances having more specific heat take longer time to get heated to a higher temperature and longer time to get cooled.



If we draw a line parallel to the time axis then it cuts the given graphs at three different points. Corresponding points on the times axis shows that  $t_C > t_B > t_A$

$$C_C > C_B > C_A$$

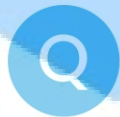
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## QUIZZES

Practice test 3 Unit 5



10 Questions



7 min

Topics

Internal Energy, Heat and Work

Start Quiz

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06 : 58



1/10



7 min



Hint

Q : The value of mechanical equivalent of heat is (J) =



41.8 Joule per calorie



4.18 Joule per calorie



41.8 Joule caloric



4.18 Joule caloric

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06 : 56



2/10



7 min



Hint

Q : A thermos bottle containing hot coffee is vigorously shaken. Consider coffee as the system, then its temperature



Increase



Decreases below than  $0^{\circ}\text{C}$



Remains the same



Decreases

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06 : 54



3/10



7 min



Hint

Q : The internal energy of a monoatomic ideal gas is



only kinetic



only potential



partly kinetic and partly potential



none of theses

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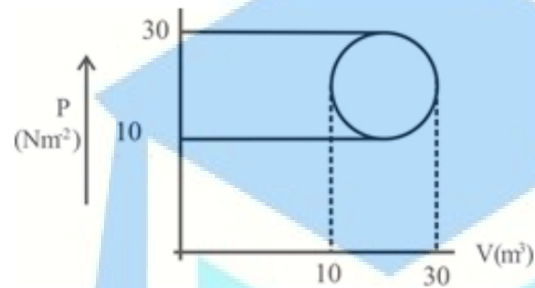


Q 4/10

7 min

i Hint

Q : The work done by the system in going through cycle is



A  $10^7 \pi \text{ J}$

B  $10^{-3} \text{ J}$

C 0

D  $10^2 \pi \text{ J}$

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06 : 50



5/10



7 min



Hint

Q : The temperature of a normal human body is  $98.6^{\circ}\text{F}$ . This temperature on centigrade scale is



$0^{\circ}\text{C}$



$37^{\circ}\text{C}$



$73^{\circ}\text{C}$



$37.6^{\circ}\text{C}$

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06 : 47



6/10



7 min



Hint

Q : if two system X and Y are in thermal equilibrium. If X is heated at constant volume and Y is heated at constant pressure, and again finally maintained at thermal equilibrium, then heat Q given to the systems X and Y and internal energy U stored in the systems X and Y are



A  $Q_x = Q_y$  and  $U_x = U_y$



B  $Q_x < Q_y$  and  $U_x < U_y$



C  $Q_x = Q_y$  and  $U_x < U_y$



D  $Q_x < Q_y$  and  $U_x = U_y$

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06 : 46



7/10



7 min



Hint

Q : The internal energy of a gram-molecule of an ideal gas depends upon



Pressure alone



Temperature alone



Volume alone



Both on pressure and temperature

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06 : 43



8/10



7 min



Hint

Q : A gas is compressed from a volume of  $2\text{m}^3$  to a volume of  $1\text{m}^3$  at a constant pressure of  $100\text{N/m}^2$ . Then it is heated at constant volume by supplying  $150\text{ J}$  of energy. As a result, the internal energy of the gas

A decreases by  $250\text{ J}$

B increases by  $50\text{ J}$

C increases by  $250\text{ J}$

D decreases by  $50\text{ J}$

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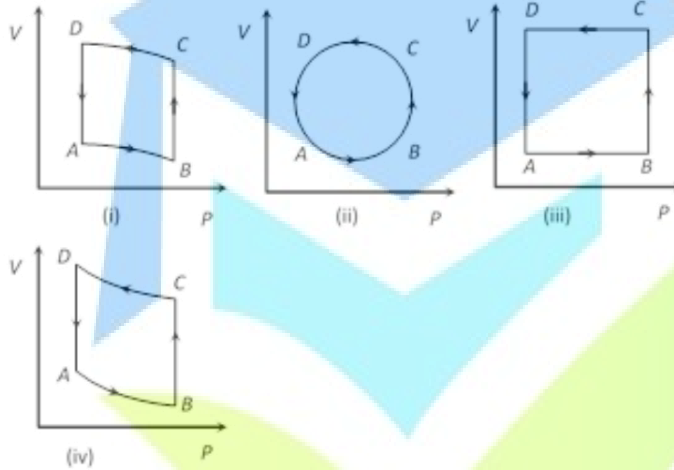


Q 9/10

7 min

Hint

Q : In the diagrams (i) to (iv) of variation of volume with changing pressure is shown. A gas is taken along the path ABCD. The change in internal energy of the gas will be



- A Positive in all cases (i) to (iv)
- B Positive in cases (i), (ii) and (iii) but zero in (iv) case
- C Negative in cases (i), (ii) and (iii) but zero in (iv) case
- D Zero in all four cases

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06 : 37



10/10

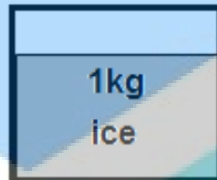
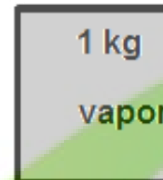


7 min



Hint

Q : Three containers filled with 1 kg of each: water, ice, and water vapor at the same temperature  $T = 0^\circ \text{C}$ . Which of the following is true about the internal energy of the substances?

 $T = 0^\circ \text{C}$  $T = 0^\circ \text{C}$  $T = 0^\circ \text{C}$ 

A

 $U_{\text{water}} > U_{\text{ice}} > U_{\text{vapor}}$ 

B

 $U_{\text{water}} < U_{\text{ice}} > U_{\text{vapor}}$ 

C

 $U_{\text{water}} = U_{\text{ice}} = U_{\text{vapor}}$ 

D

 $U_{\text{ice}} < U_{\text{water}} < U_{\text{vapor}}$ 

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## QUIZ RESULT

Practice test 3 Unit 5



10



7 min



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Result Detail

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| Incorrect   | 0  |
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Physics

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Practice test 3 Unit 5



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1/10

Q : The value of m mechanical equivalent of heat is (J) =



41.8 Joule per calorie



4.18 Joule per calorie



41.8 Joule caloric



4.18 Joule caloric

Explanation

As 1 calorie = 4.18 Joule

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## Practice test 3 Unit 5



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Incorrect



2/10

Q : A thermos bottle containing hot coffee is vigorously shaken. Consider coffee as the system, then its temperature

A

Increase

B

Decreases below than  $0^{\circ}\text{C}$

C

Remains the same

D

Decreases

### Explanation

By shaking kinetic energy of particles of coffee increase.

$K.E \propto T$

As so its temperature will also increase

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## Practice test 3 Unit 5



Correct



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Incorrect



3/10

Q : The internal energy of a monoatomic ideal gas is

A

only kinetic

B

only potential

C

partly kinetic and partly potential

D

none of theses

Explanation

Gas molecules has only kinetic energy.

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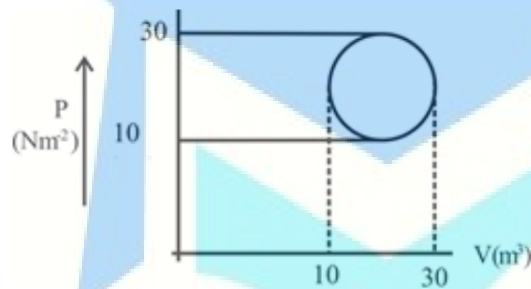


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4/10

Q : The work done by the system in going through cycle is



A

$$10^7 \pi \text{ J}$$

B

$$10^{-3} \text{ J}$$

C

$$0$$

D

$$10^2 \pi \text{ J}$$

Explanation

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$$\text{Area of circle} = \pi r^2$$



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$$W = \pi r^2$$

$$W = \pi \times 10^2 \text{ J}$$

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## Practice test 3 Unit 5



Correct



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5/10

Q : The temperature of a normal human body is 98.6<sup>0</sup>F. This temperature on centigrade scale is



0<sup>0</sup>C



37<sup>0</sup>C



73<sup>0</sup>C



37.6<sup>0</sup>C

Explanation

$$\frac{98.6 - 32}{180} = \frac{C}{100}$$
$$C = 37^{\circ}$$

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## Practice test 3 Unit 5



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Incorrect



6/10

Q : if two system X and Y are in thermal equilibrium. If X is heated at constant volume and Y is heated at constant pressure, and again finally maintained at thermal equilibrium, then heat Q given to the systems X and Y and internal energy U stored in the systems X and Y are

A

$Q_x = Q_y$  and  $U_x = U_y$

B

$Q_x < Q_y$  and  $U_x < U_y$

C

$Q_x = Q_y$  and  $U_x < U_y$

D

$Q_x < Q_y$  and  $U_x = U_y$

### Explanation

At constant volume no work is done and at constant pressure some heat is converted into work so  $Q_x < Q_y$   
 $U_x = U_y$



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## Practice test 3 Unit 5



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Incorrect



7/10

Q : The internal energy of a gram-molecule of an ideal gas depends upon

A

Pressure alone

B

Temperature alone

C

Volume alone

D

Both on pressure and temperature

### Explanation

Internal energy is merely K.E because molecules do not exert force on each other except collision.

$$I.E \propto \langle K.E \rangle \propto T$$

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8/10

Q : A gas is compressed from a volume of  $2\text{m}^3$  to a volume of  $1\text{m}^3$  at a constant pressure of  $100\text{N/m}^2$ . Then it is heated at constant volume by supplying  $150\text{ J}$  of energy. As a result, the internal energy of the gas

A

decreases by  $250\text{ J}$ 

B

increases by  $50\text{ J}$ 

C

increases by  $250\text{ J}$ 

D

decreases by  $50\text{ J}$ 

## Explanation

As we know,  $\Delta Q = \Delta u + \Delta w$  (1st law of thermodynamic)  
 $\Rightarrow \Delta Q = \Delta u + P\Delta v$  or

$$150 = \Delta u + 100(1 - 2) = \Delta u - 100 \therefore \Delta u = 150 + 100 = 250\text{ J}$$

Thus the internal energy of the gas increase by  $250\text{ J}$



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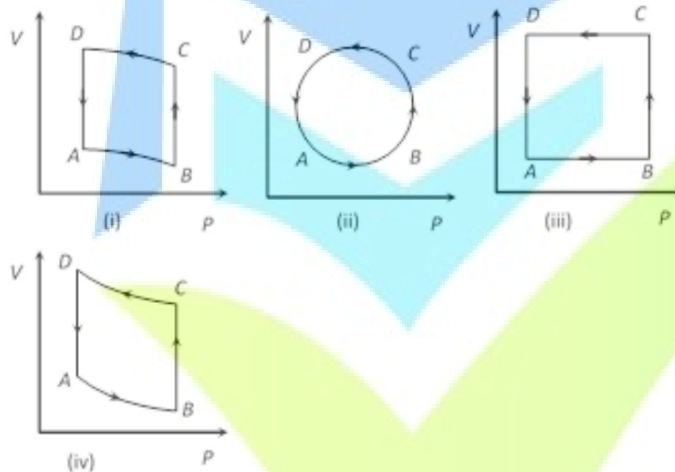


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Q : In the diagrams (i) to (iv) of variation of volume with changing pressure is shown. A gas is taken along the path ABCD. The change in internal energy of the gas will be



A

Positive in all cases (i) to (iv)

B

Positive in cases (i), (ii) and (iii) but zero in (iv) case

C

Negative in cases (i), (ii) and (iii) but zero in (iv) case

D

Zero in all four cases

Explanation



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In all given cases, process is cyclic and in cyclic process  $DU = 0$ .



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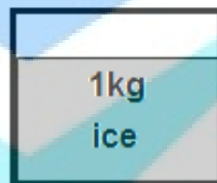
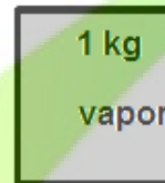


Incorrect



10/10

Q : Three containers filled with 1 kg of each: water, ice, and water vapor at the same temperature  $T = 0^\circ\text{C}$ . Which of the following is true about the internal energy of the substances?

 $T = 0^\circ\text{C}$  $T = 0^\circ\text{C}$  $T = 0^\circ\text{C}$ 

A

$$U_{\text{water}} > U_{\text{ice}} > U_{\text{vapor}}$$

B

$$U_{\text{water}} < U_{\text{ice}} > U_{\text{vapor}}$$

C

$$U_{\text{water}} = U_{\text{ice}} = U_{\text{vapor}}$$

D

$$U_{\text{ice}} < U_{\text{water}} < U_{\text{vapor}}$$

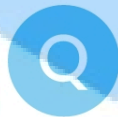
Explanation

internal energy only depend upon temperature so vapour has more temperature than water and water has more temperature than ice



## QUIZZES

Practice test 4 Unit 5



10 Questions



7 min

Topics

Second law of thermodynamics (Lord Kelvin statement)

Start Quiz

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06 : 58



1/10



7 min



Hint

Q : The statement "it is impossible to devise a process, which may convert heat, extracted from a single reservoir entirely into work" is given by:

A

Lord Kelvin

B

Joule

C

Newton

D

Pascal

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06 : 56



2/10



7 min



Hint

Q : No heat engine can be more efficient than a carnot engine operating between the same two



Pressure



Carnot cycle



Temperatures



working substance

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06 : 54



3/10



7 min



Hint

Q : Two ideal heat engines (A) and (B) have their sources at 600 K and 400 K and their sinks at 300 K and 250 K respectively. What can you say about their efficiency?



A is more than B



A is less than B



Both are equal efficient



The data given is not sufficient

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06 : 52



4/10



7 min



Hint

Q : If the temperature of the heat source is increased, the efficiency of a Carnot's engine



Increases



Decreases



Remains constant



First **increases** and then becomes constant

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06 : 50



5/10



7 min



Hint

Q : A carnot engine has the same efficiency between (i) 100 K and 500 K and (ii) T and 900 K. Find T.



200 K



190 K



180 K



none of these

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06 : 48



6/10



7 min



Hint

Q : An ideal Carnot engine whose efficiency is 40% receives heat at 500K. If the efficiency is to be 50 % the intake temperature for the same exhaust temperature is

A

600 K

B

900 K

C

800 K

D

700 K

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06 : 47



Q 7/10

7 min

Hint

Q : The efficiency of heat engine is defined as

A  $\eta = \frac{\text{Output}}{\text{Input}}$

B  $\eta = \frac{\text{Input}}{\text{Output}}$

C  $\eta = \text{Output} \times \text{Input}$

D  $\eta = \frac{1}{\text{Input} \times \text{Output}}$

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06 : 44



8/10



7 min



Hint

Q : On which factor the efficiency of Carnot engine depends upon



temperature of sink



temperature of source



both A & B



working substance

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06 : 43



9/10



7 min



Hint

Q : If the temperature of the sink is decreased then the efficiency of the Carnot engine



decreases



increases



remain same



zero

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06 : 39



10/10



7 min



Hint

Q : Heat cannot by itself flow from a body at lower temperature to a body at higher temperature? is a statement or consequence of

A

Second law of thermodynamics

B

Conservation of momentum

C

Conservation of mass

D

First law of thermodynamics

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## QUIZ RESULT

Practice test 4 Unit 5



10



7 min



19-Apr-2021



0 sec



0/10



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Result Detail

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|             |    |
|-------------|----|
| Correct     | 0  |
| Incorrect   | 0  |
| Unattempted | 10 |

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Physics

0%



## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



1/10

Q : The statement "it is impossible to devise a process, which may convert heat, extracted from a single reservoir entirely into work" is given by:

A

Lord Kelvin

B

Joule

C

Newton

D

Pascal

Explanation

This statement is given by lord kelvin

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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



1/10

Q : The statement "it is impossible to device a process, which may convert heat, extracted from a single reservoir entirely into work" is given by:

A

Lord Kelvin

B

Joule

C

Newton

D

Pascal

Explanation

This statement is given by lord kelvin

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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



2/10

Q : No heat engine can be more efficient than a carnot engine operating between the same two

A

Pressure

B

Carnot cycle

C

Temperatures

D

working substance

Explanation

Carnot Theorem.

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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



3/10

Q : Two ideal heat engines (A) and (B) have their sources at 600 K and 400 K and their sinks at 300 K and 250 K respectively. What can you say about their efficiency?

A

A is more than B

B

A is less than B

C

Both are equal efficient

D

The data given is not sufficient

Explanation

$$\eta_A = 1 - \frac{T_2}{T_1}$$

$$\eta_A = 1 - \frac{300}{600}$$

$$\eta_A = 0.5$$

$$\eta_A > \eta_B$$

$$\eta_B = 1 - \frac{T_2}{T_1}$$

$$\eta_B = 1 - \frac{250}{400}$$

$$\eta_B = 0.37$$



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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



4/10

Q : If the temperature of the heat source is increased, the efficiency of a Carnot's engine

A

Increases

B

Decreases

C

Remains constant

D

First increases and then becomes constant

Explanation

$$\eta = 1 - \frac{T_2}{T_1}$$

it is clear that if temperature of hot reservoir " $T_1$ " increase then " $\eta$ " will also increase.

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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



5/10

Q : A carnot engine has the same efficiency between (i) 100 K and 500 K and (ii) T and 900 K. Find T.

A

200 K

B

190 K

C

180 K

D

none of these

Explanation

$$\eta = 1 - \frac{T_2}{T_1} = 1 - \frac{T_3}{T_4}$$

$$\frac{T_2}{T_1} = \frac{T_3}{T_4}$$

$$\frac{100}{500} = \frac{T_3}{900}$$

$$T_3 = \frac{100}{500} \times 900$$

$$= 20 \times 9$$

$$T_3 = 180K$$

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Practice test 4 Unit 5

temperature for the same exhaust temperature is

A 600 K

B 900 K

C 800 K

D 700 K

Explanation

$$\eta = 40\% = \frac{40}{100} = 0.4$$

$$T_1 = 500 \text{ K}$$

$$T_2 = ?$$

$$\eta = 1 - \frac{T_2}{T_1}$$

$$0.4 = 1 - \frac{T_2}{500}$$

$$\frac{T_2}{500} = 0.6$$

$$T_2 = \frac{0.6}{10} \times 500 = 300 \text{ K}$$

$$0.5 = 1 - \frac{300}{T_1}$$

$$\frac{300}{T_1} = 0.5$$

$$\frac{300}{0.5} = T_1$$

$$600 \text{ K} = T$$

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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



7/10

Q : The efficiency of heat engine is defined as

A

$$\eta = \frac{\text{Output}}{\text{Input}}$$

B

$$\eta = \frac{\text{Input}}{\text{Output}}$$

C

$$\eta = \text{Output} \times \text{Input}$$

D

$$\eta = \frac{1}{\text{Input} \times \text{Output}}$$

Explanation

$$\eta = \frac{\text{Output}}{\text{Input}}$$

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## Practice test 4 Unit 5



Correct



Unattempted



Incorrect



8/10

Q : On which factor the efficiency of Carnot engine depends upon

A

temperature of sink

B

temperature of source

C

both A & B

D

working substance

Explanation

$$\eta = 1 - \frac{T_2}{T_1}$$
$$\eta \propto T_1 T_2, \eta \propto \frac{1}{T_1}$$

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## Practice test 4 Unit 5



Correct



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Incorrect



9/10

Q : If the temperature of the sink is decreased then the efficiency of the Carnot engine

A

decreases

B

increases

C

remain same

D

zero

Explanation

$$\eta = 1 - \frac{T_2}{T_1}$$

If  $T_2$  is decreased then  $\eta$  will increase because we get large value in numerator.

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## Practice test 4 Unit 5



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10/10

Q : Heat cannot by itself flow from a body at lower temperature to a body at higher temperature? is a statement or consequence of

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